Assignment 1 Solution

Problem 1 (2 points)

No solution provided.

Problem 2 (5 points)

a) The Graphic User Interface (GUI) allowed multiple programs to run simultaneously. The new release also introduced versions of Microsoft Word and Excel software that took advantage of the GUI.

b) Each new chip contained roughly twice as much capacity as its predecessor, and each chip was released within 24 months of the previous chip.'

c) In 1979.

d) She led the development of the NASA Apollo Guidance Computer (AGC).

e) Burroughs Corporation built ILLIAC IV by collaborating with Texas Instruments. Fairchild Semiconductor produced the memory for ILLIAC IV. Fairchild-built the Processing Element Memory (PEM) that could store 16,834 bytes inevery one of the 64 processors in ILLIAC IV.

f) General Motors Research Laboratories and IBM.

g) El Capitan, 1,080,000 (45,000 × 24-core Optimized 4th Generation EPYC 24C @1.8 GHz).

h) SanDisk.

i) Net neutrality refers to the equal treatment of all data sent across the Internet. Net neutrality protects freedom of speech and ensures the Internet is accessible to all.

j) Netscape Communications by Brendan Eich.

Problem 3 (3 points)

Mac (Apple Silicon)

a) Number and model of CPU processor used

Setting -> General -> About -> System Report

```
Model Number:          G16RLL/A
Chip:                  Apple M1 Max
Total Number of Cores: 10 (8 performance and 2 efficiency)
```

b) CPU clock speed

Not provided natively in Apple Silicon

c) Computer Random Access Memory (RAM) size

Setting -> General -> About -> System Report

```
Memory:                64 GB
```

d) Graphics processing unit if any (GPU)

Setting -> General -> About -> System Report -> Graphics/Display

```
Apple M1 Max:

  Chipset Model:         Apple M1 Max
  Type:                  GPU
  Bus:                   Built-In
  Total Number of Cores: 32
  Vendor:                Apple (0x106b)
  Metal Support:         Metal 3
```

e) How many bytes does your computer hard drive has to store information?

Setting -> General -> About -> System Report -> Storage

```
Macintosh HD:

  Free:       88.49 GB (88,492,347,392 bytes)
  Capacity:   2 TB (1,995,218,165,760 bytes)
```

Window

Open the' Task Manager' by pressing Ctrl + Shift + Esc to see your specifications.

Problem 4 (5 points)

a. Create a new column in the spreadsheet to assign a weight category for each car according to the parameters shown in the table below. Use Excel to classify the car weight according to the following table. In your answer, show me an example of the Excel formula(s).

=VLOOKUP(C2:C117, $L$1:$M$4, 2)

L	M
Weight Range (lbs)	Weight Category
0	Light
3000	Medium
3900	Heavy

b. Concatenate the car model and the weight category created in part (a) separated by "_". Place the concatenated result into a new column.

=CONCAT(A2,"_",H2) or =CONCATENATE(A2,"_", H2)

c. Count how many cars belong to each of the new weight classes using the Excel COUNT commands.

=COUNTIF(H2#, M2), =COUNTIF(H2#, M3), =COUNTIF(H2#, M4)

L	M	N
Weight Range (lbs)	Weight Category	Counts
0	Light	65
3000	Medium	46
3900	Heavy	5
	Total	116

d) Use Excel conditional formatting to color code the values based on car new weight category. Assign purple to Heavy, Blue to Category Medium, and Green to Light.

Select the Conditional Formatting -> Highlight Cells Rules -> Equal To...
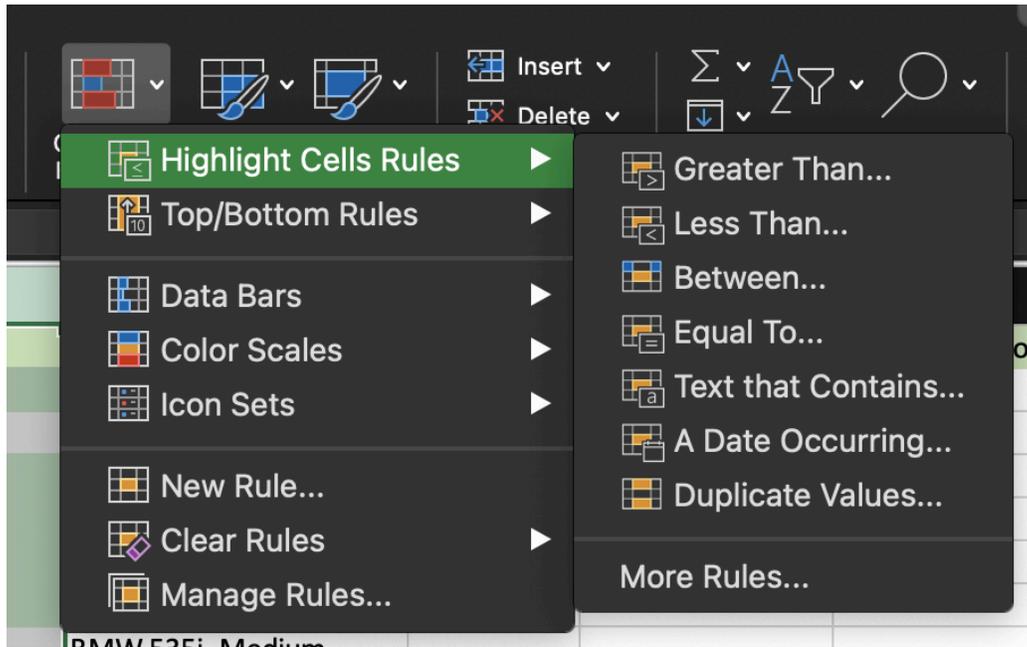
Creates the new rule for each category. Please select the Custom Format if required.

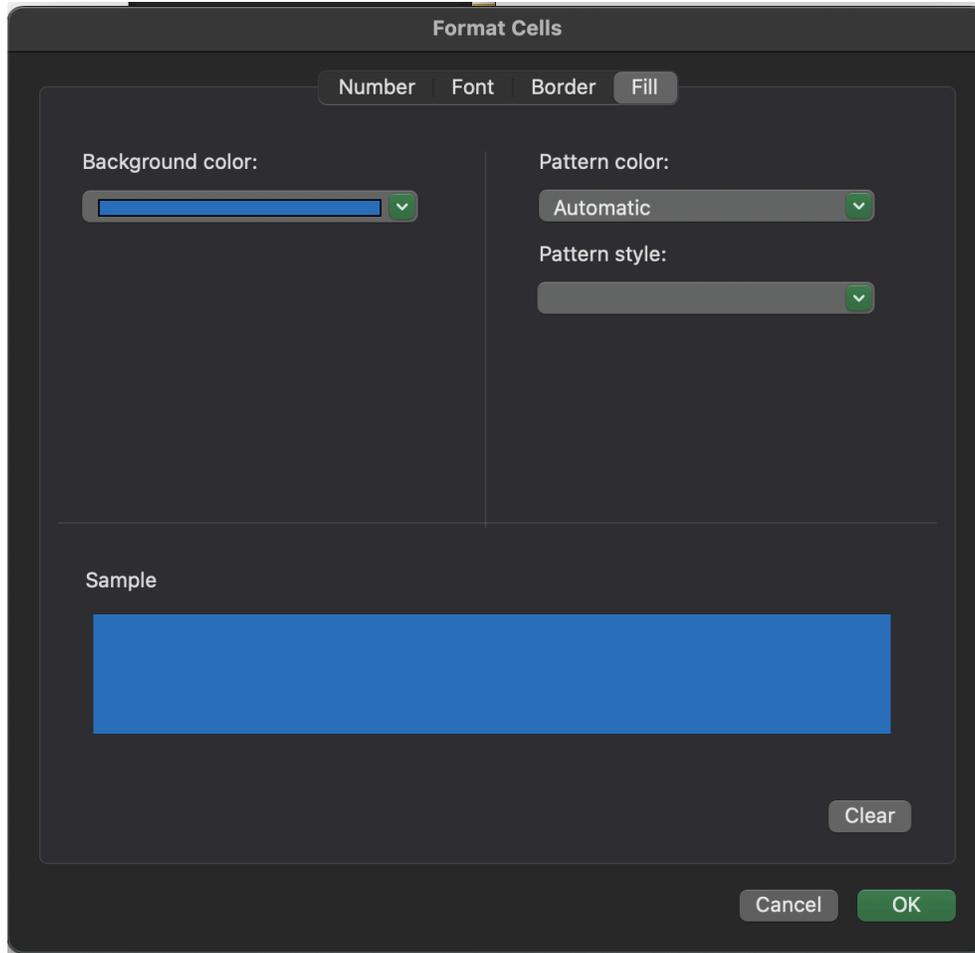|	H	I	J	K	L	M	N
allo	Weight	Model+Weight			Weight Range (lbs)	Weight Category	Counts
3.2	Light	Acura Integra_Light			0	Light	65
18	Medium	Acura Legend V6_Medium			3000	Medium	46
1.1	Light	Audi 100_Light			3900	Heavy	5
5.9	Light	Audi 80_Light					
5.9	Light	Audi 90_Light				Total	116
5.4	Light	BMW 32!					
1.1	Medium	BMW 53!					
5.7	Light	Buick Cer					
18	Medium	Buick Ele					
18	Medium	Buick Le !					
3.8	Medium	Buick Riv					
3.6	Light	Buick Sky					
25	Heavy	Cadillac E					
18	Medium	Cadillac D					
3.8	Medium	Cadillac E					
27	Heavy	Chevrolet					
5.6	Light	Chevrolet					
5.5	Medium	Chevrolet					

New Formatting Rule

Style: Cla

Light Red Fill with Dark Red Text
Yellow Fill with Dark Yellow Text
Green Fill with Dark Green Text
Light Red Fill
Red Text
Red Border
✓ Custom Format...

Format on

Cell Value

Format with

=$M$3

AaBbCcYyZz

Cancel   OK

Format Cells

Number   Font   Border   **Fill**

Background color:

Pattern color:
Automatic

Pattern style:

Sample

Clear

Cancel   OK

Weight	Model+Weight		Weight Range (lbs)	Weight Category	Counts
Light	Acura Integra_Light		0	Light	65
Medium	Acura Legend V6_Medium		3000	Medium	46
Light	Audi 100_Light		3900	Heavy	5
Light	Audi 80_Light				
Light	Audi 90_Light			Total	116
Light	BMW 325i_Light				
Medium	BMW 535i_Medium				
Light	Buick Century_Light				
Medium	Buick Electra V6_Medium				
Medium	Buick Le Sabre V6_Medium				
Medium	Buick Riviera V6_Medium				
Light	Buick Skylark_Light				
Heavy	Cadillac Brougham V8_Heavy				
Medium	Cadillac De Ville V8_Medium				
Medium	Cadillac Eldorado V8_Medium				
Heavy	Chevrolet Astro V6_Heavy				
Light	Chevrolet Beretta_Light				

e) Make a plot in Excel of car weight (in the y-axis) versus Horsepower_hp (in x-axis). Create the best curve-fit to the data using R-square as the metric that indicates correlation. Make sure you add labels for the axes and units. Comment on the relationship between car weight and engine horsepower.

Insert -> Recommended Charts or Scatter Chart
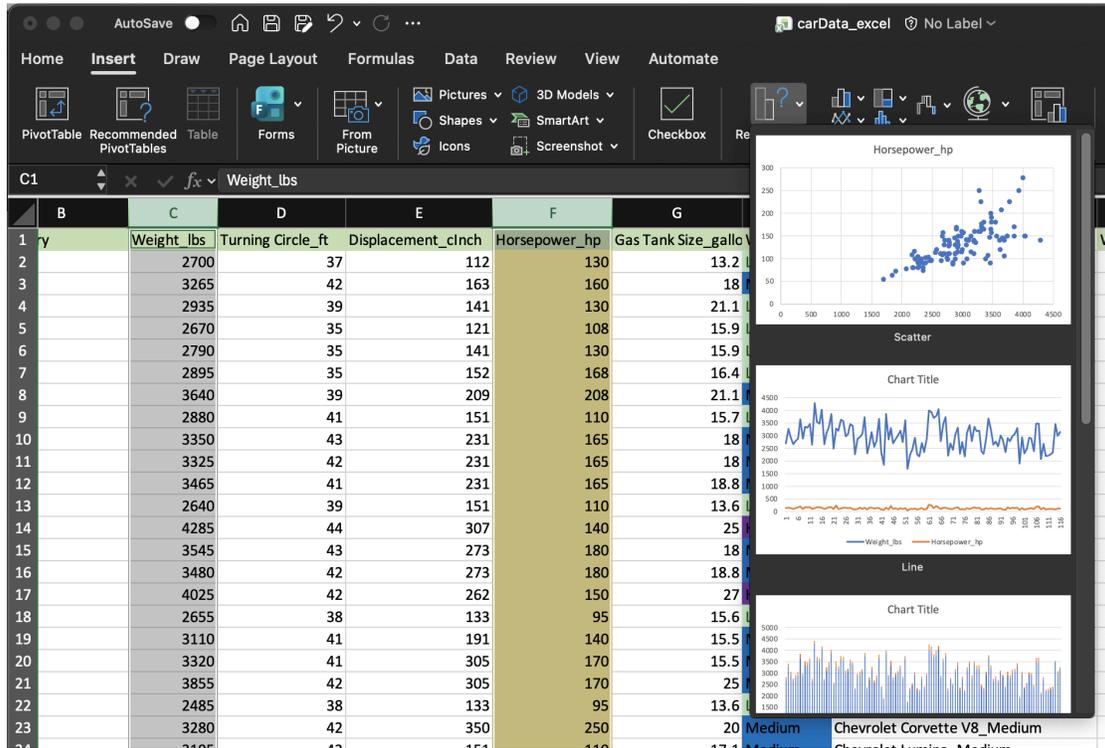
The Excel will automatically generate the plot with Weight_lbs on the x-axis and Horsepower_hp on the y-axis. Since the problem stated that the weight is y-axis, right-click the chart and select the 'Select Data...'

Then we can manually select the values for the X and Y axes.
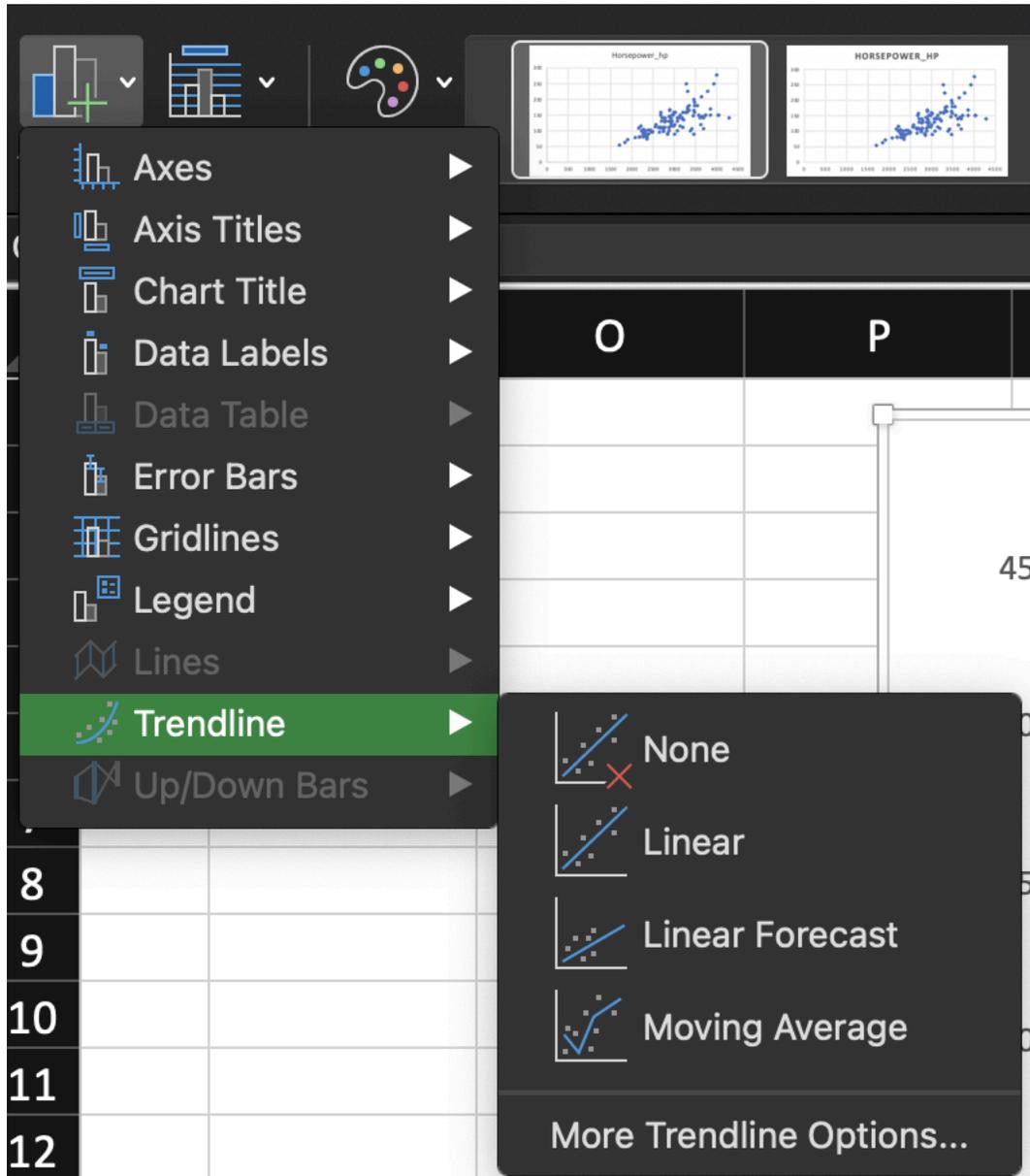
To add the labels, select the chart -> Chart Design -> Add Chart Element -> Axis Titles -> Select both Primary Horizontal and Vertical
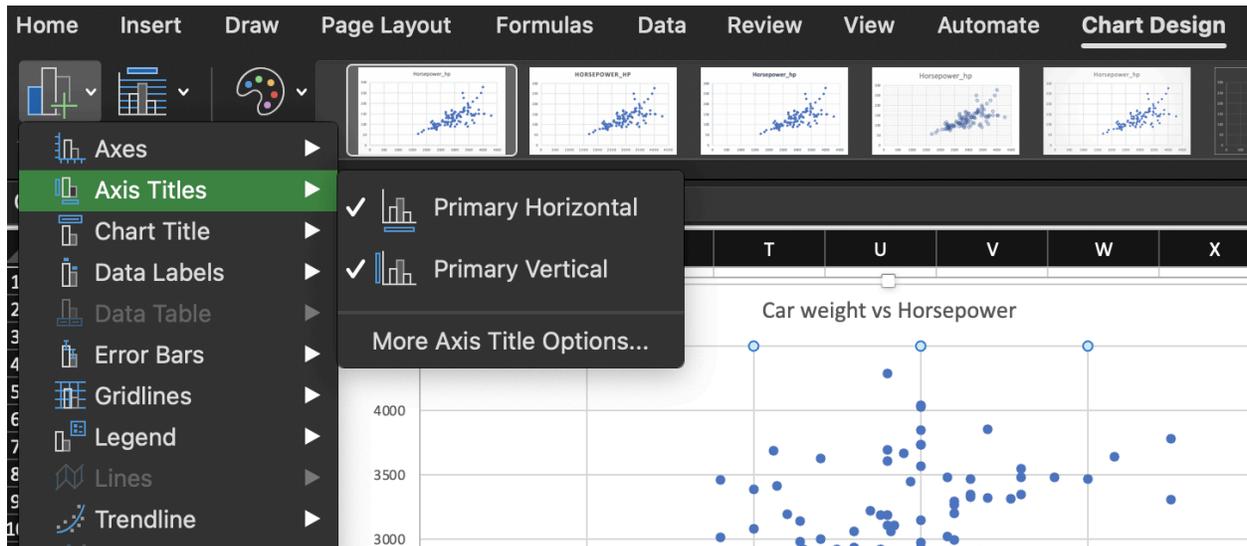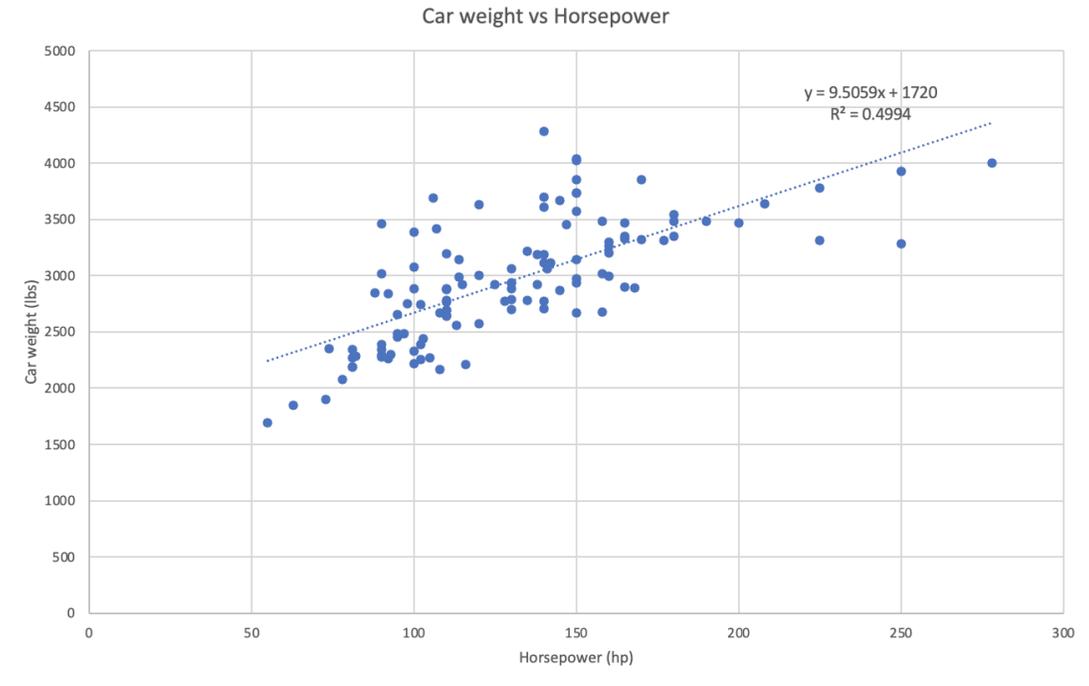
To fit the scatter plot, select the chart -> Chart Design -> Add Chart Element -> Trendline
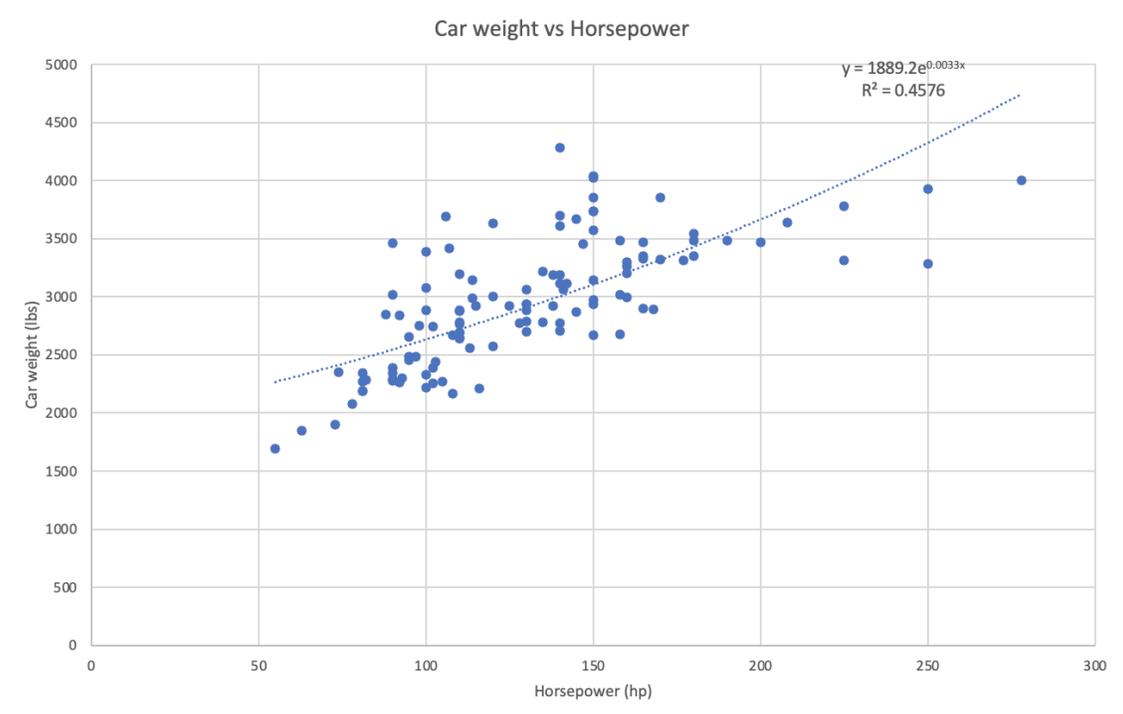

Horsepower increases as car weight increases. A linear model fit seems adequate based on the R-squared value.

Horsepower and car weight are correlated. A least-square linear regression model suggest 49.94% of the data can be explained with the model (R-square = 0.4994) .

Linear (R^2 = 0.4994)

Exponential (R^2 = 0.4576)

Problem 5 (5 points)

a) The bank offers a loan at 5.8% per year. Find the monthly payments to pay back the total loan.

=PMT(C6/12,C5,C3, 0, 1)

$83,769.85

C10		fx ∨	=PMT(C6/12,C5,C3, 0, 1)
	A	B	C
1			
2		**5 Years**	
3		Loan Amount	$4,375,000
4		Number of Years	5
5		Number of Months	60
6		Yearly Interest Rate	5.80%
7		Montly Interest Rate	0.48%
8			
9			
10		**Montly Payment**	**($83,769.85)**

b) Estimate the amount of the load paid as interest to the bank.

$651,191.18

C14		fx ∨	=C13+C3
	A	B	C
1			
2		**5 Years**	
3		Loan Amount	$4,375,000
4		Number of Years	5
5		Number of Months	60
6		Yearly Interest Rate	5.80%
7		Montly Interest Rate	0.48%
8			
9			
10		**Montly Payment**	**($83,769.85)**
11		Yearly Payment	($1,005,238.24)
12			
13		Total Payment	($5,026,191.18)
14		Amount of Interest	**($651,191.18)**

c) If a loan is obtained at 10 years instead, explain the new annual payments needed. What is the drawback of the new loan? Explain.

A 10-year loan needs to pay $722,013.36 more in interest compared to the 5-year loan.

5 Years			10 Years	
Loan Amount	$4,375,000		Loan Amount	$4,375,000
Number of Years	5		Number of Years	10
Number of Months	60		Number of Months	120
Yearly Interest Rate	5.80%		Yearly Interest Rate	5.80%
Montly Interest Rate	0.48%		Montly Interest Rate	0.48%
Montly Payment	**($83,769.85)**		Montly Payment	($47,901.70)
Yearly Payment	($1,005,238.24)		Yearly Payment	($574,820.45)
Total Payment	($5,026,191.18)		Total Payment	($5,748,204.54)
Amount of Interest	**($651,191.18)**		Amount of Interest	**($1,373,204.54)**